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(12) **United States Patent**
Cheng

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(54) **CASE LOCK**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(22) Filed: **Mar. 21, 2002**

(51) **Int. Cl.**⁷ **E05C 19/14**; E05C 5/00

(52) **U.S. Cl.** **292/247**; 292/113; 292/DIG. 49; 292/DIG. 48; 292/DIG. 50; 70/73; 70/76

(58) **Field of Search** 292/247, 113, 292/DIG. 49, DIG. 48, DIG. 50; 70/73, 76; 190/114, 119-121

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Primary Examiner—J. J. Swann

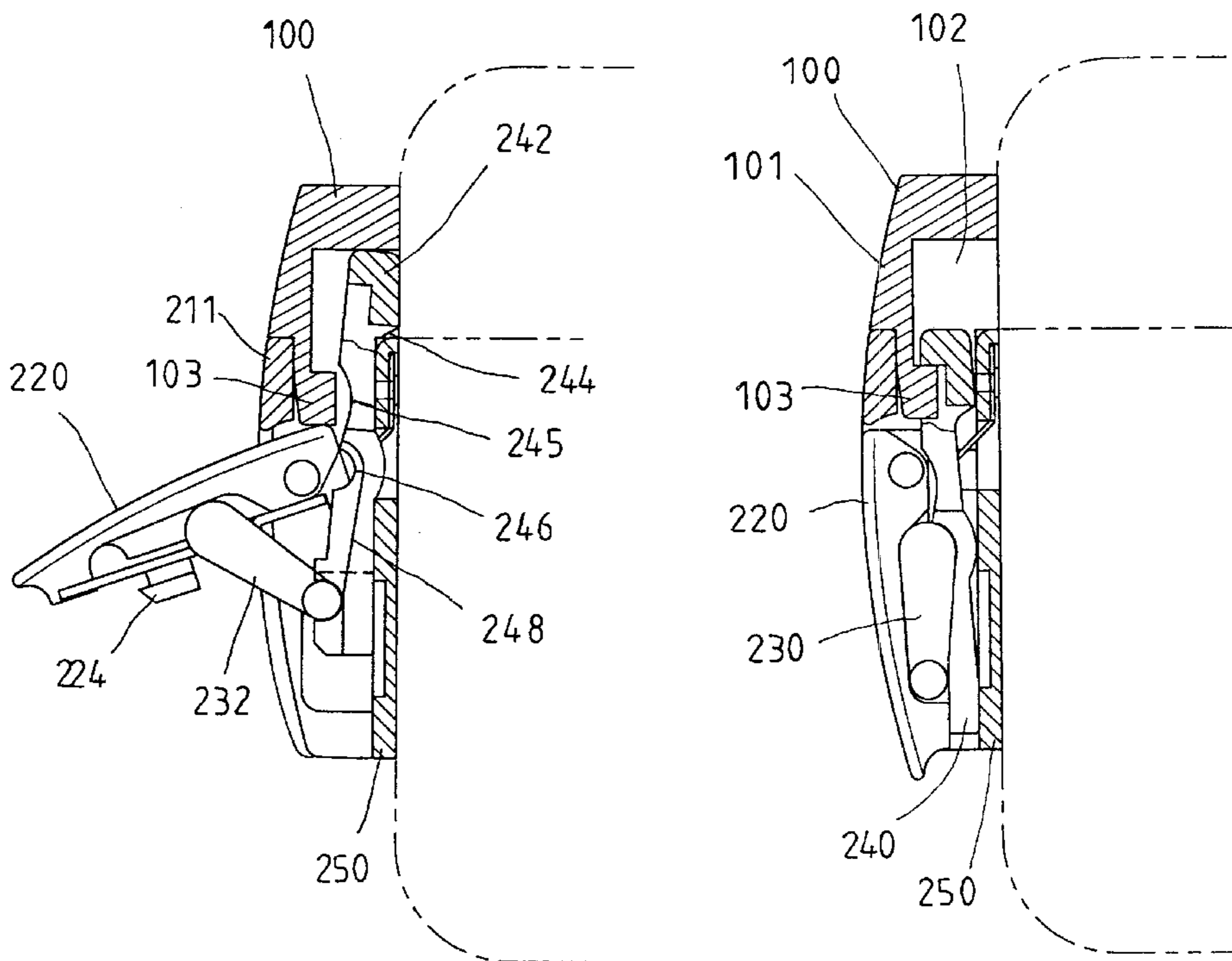
Assistant Examiner—Matthew E. Rodgers

(74) *Attorney, Agent, or Firm*—Browdy and Neimark, P.L.L.C.

(57) **ABSTRACT**

A case lock is disclosed to include a fixed retaining member and a movable lock body assembly respectively fastened to the top and bottom cover shells of a case for locking the case. The movable lock body assembly includes a front cover, an actuating member pivoted to the front cover, a sliding retainer, a link pivoted between the actuating member and the sliding retainer and adapted to move the sliding retainer in an axial direction while the link is driven by the actuating member and moved along with said actuating member, and a back cover covered on the front cover and defining with the front cover a space in which the actuating member, the link and the sliding retainer are positioned.

11 Claims, 5 Drawing Sheets



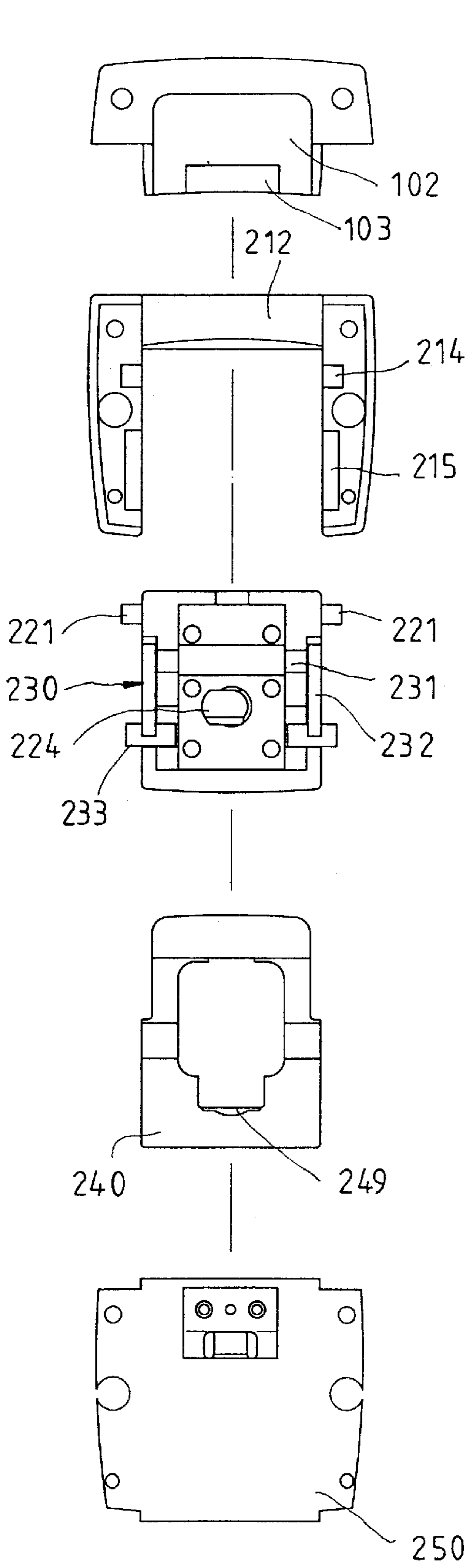


FIG. 2

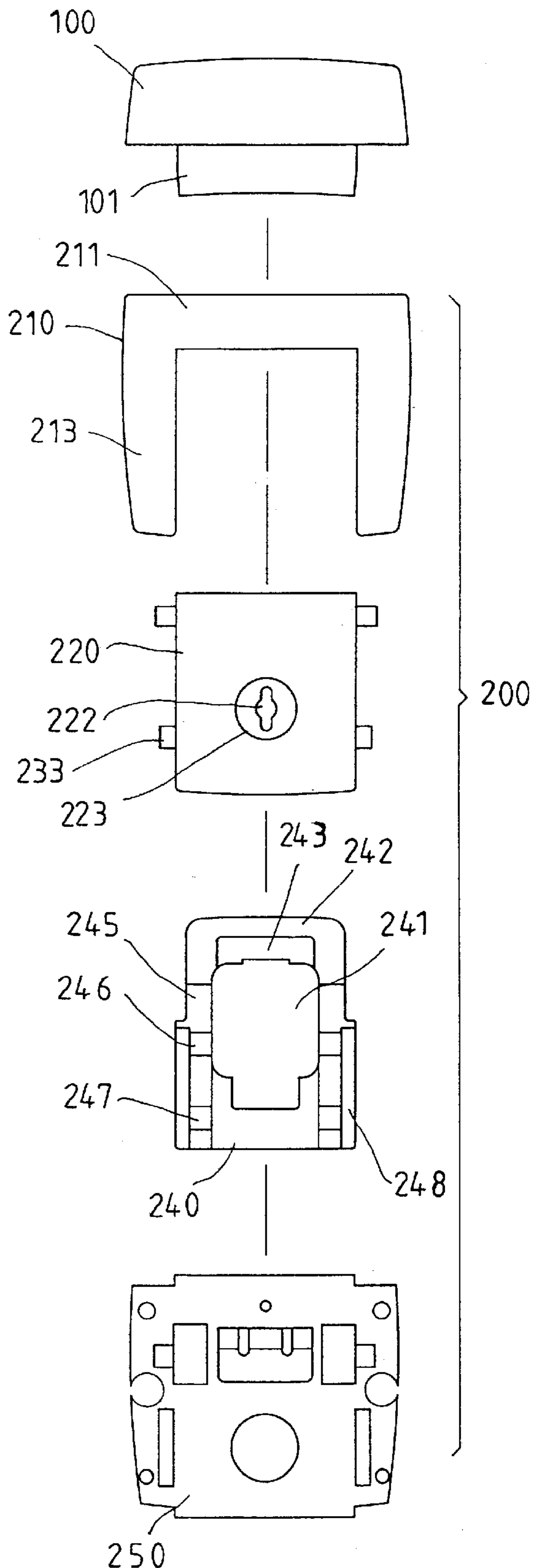


FIG. 1

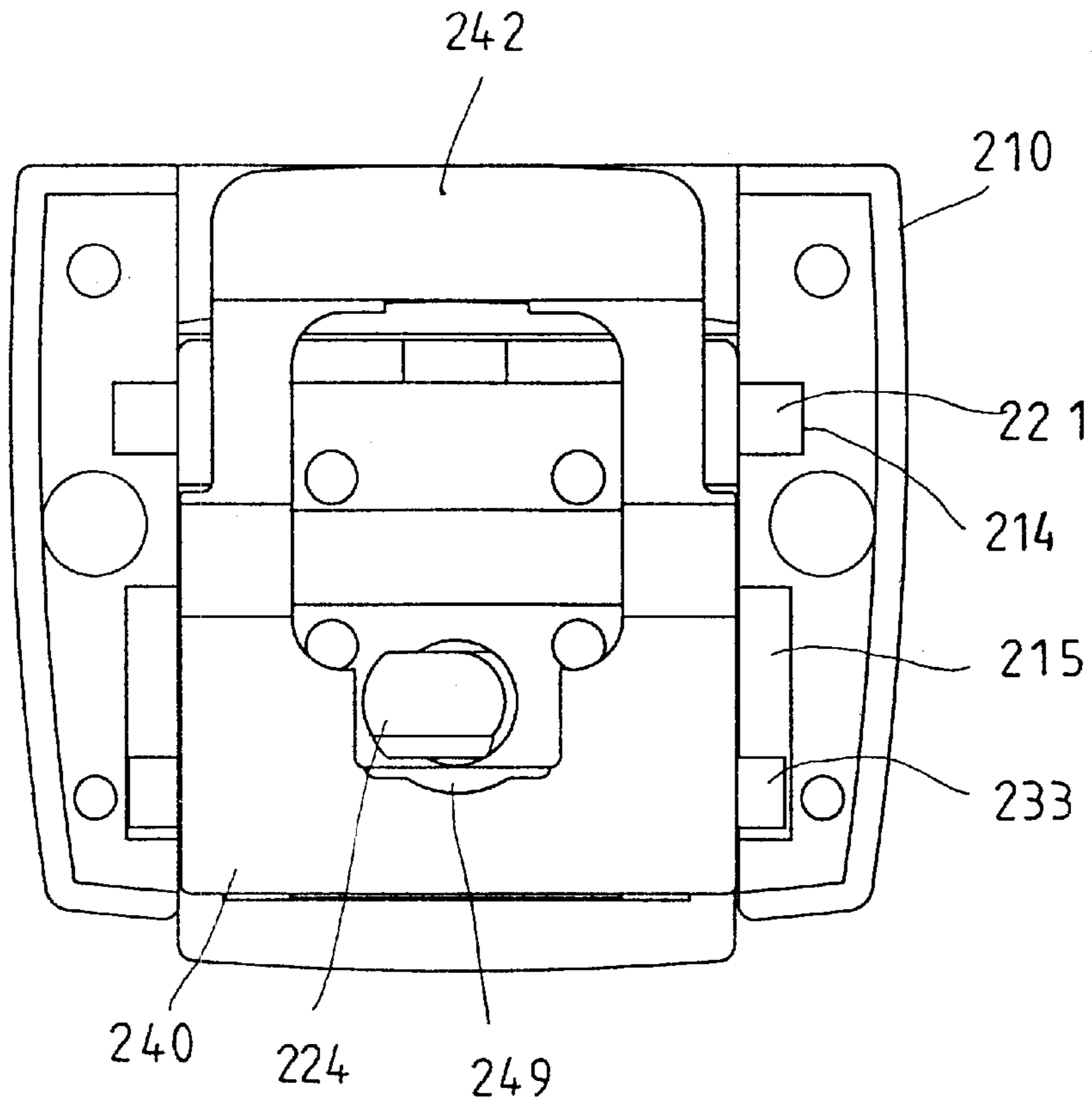


FIG. 3

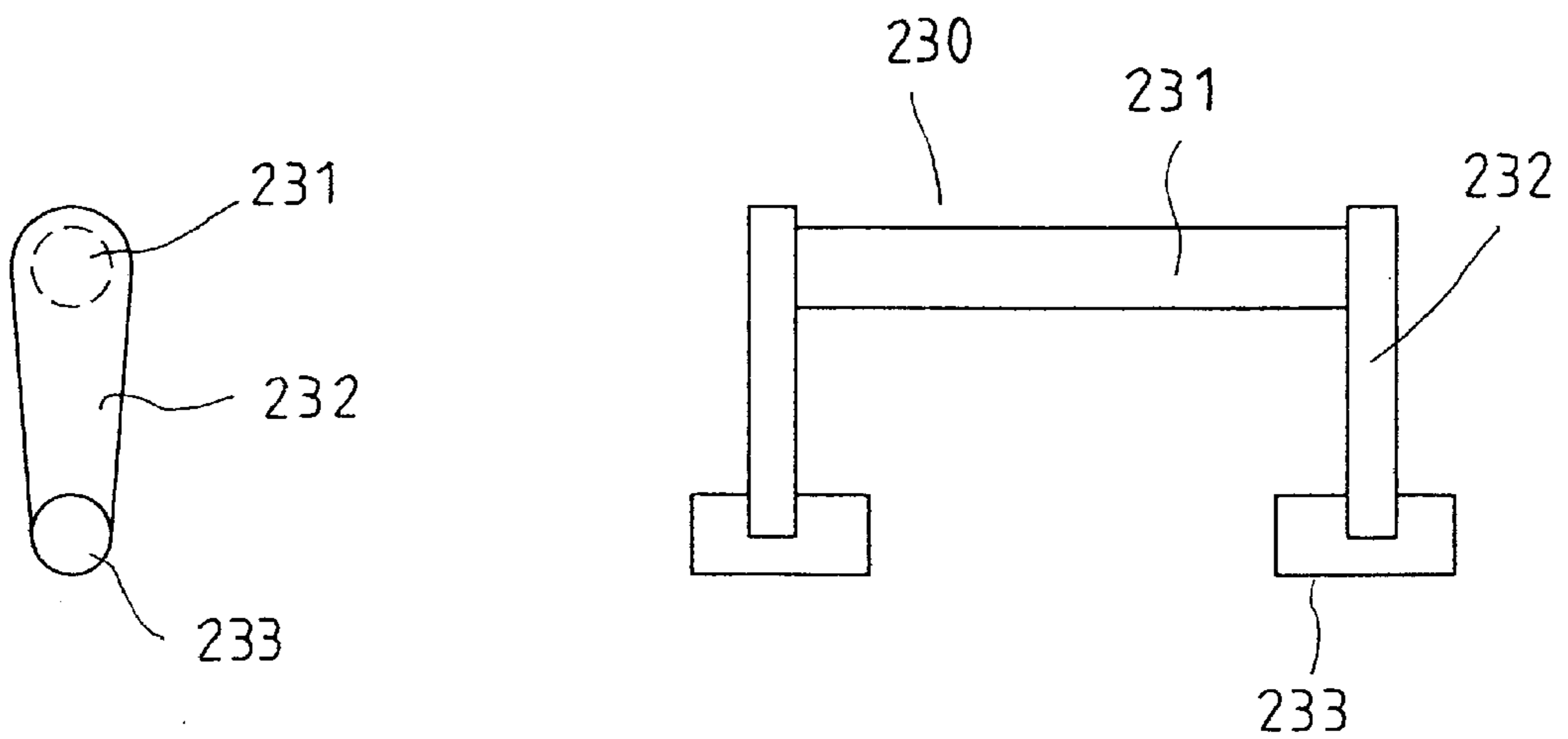


FIG. 5

FIG. 4

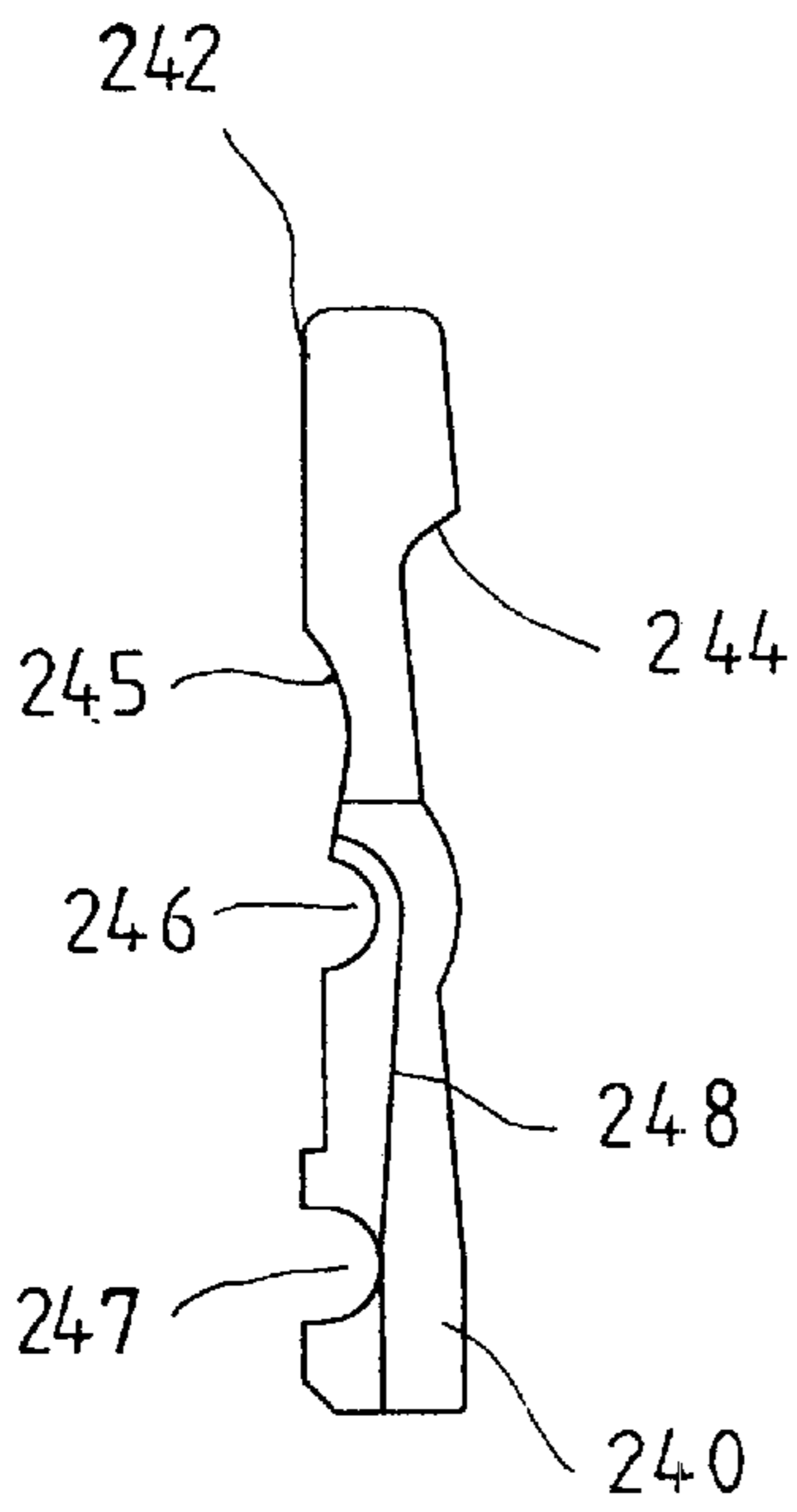


FIG. 6

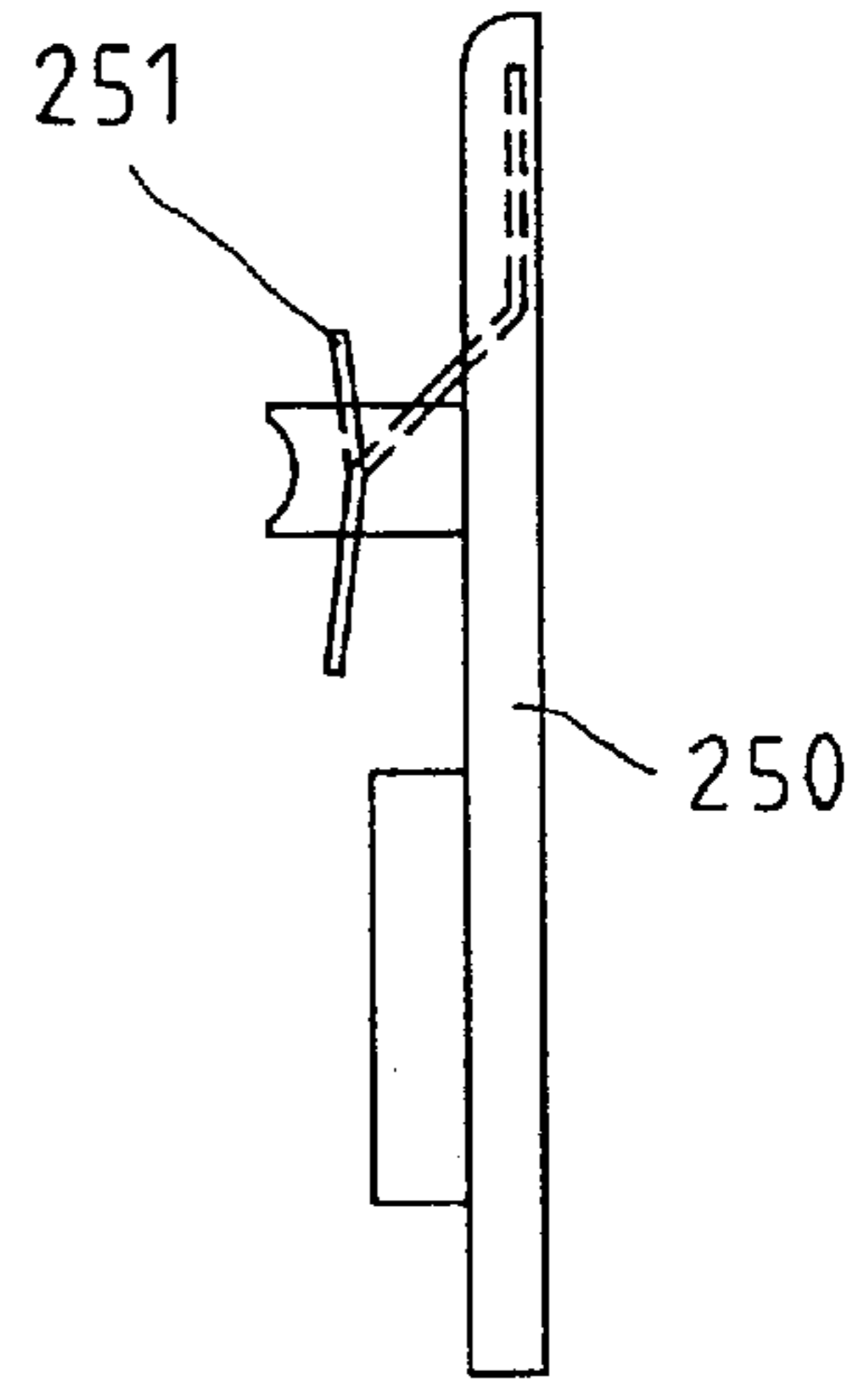


FIG. 7

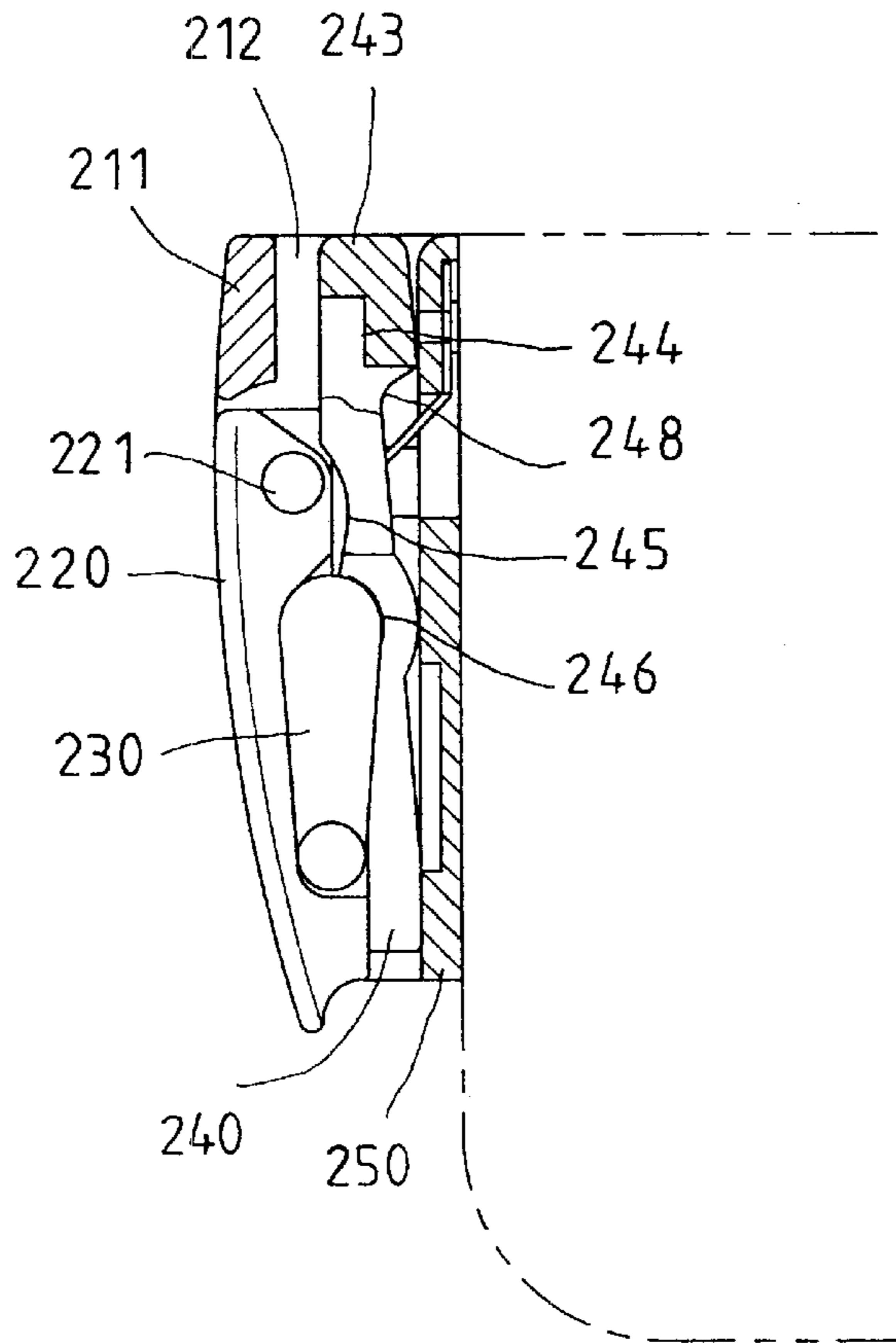


FIG. 8

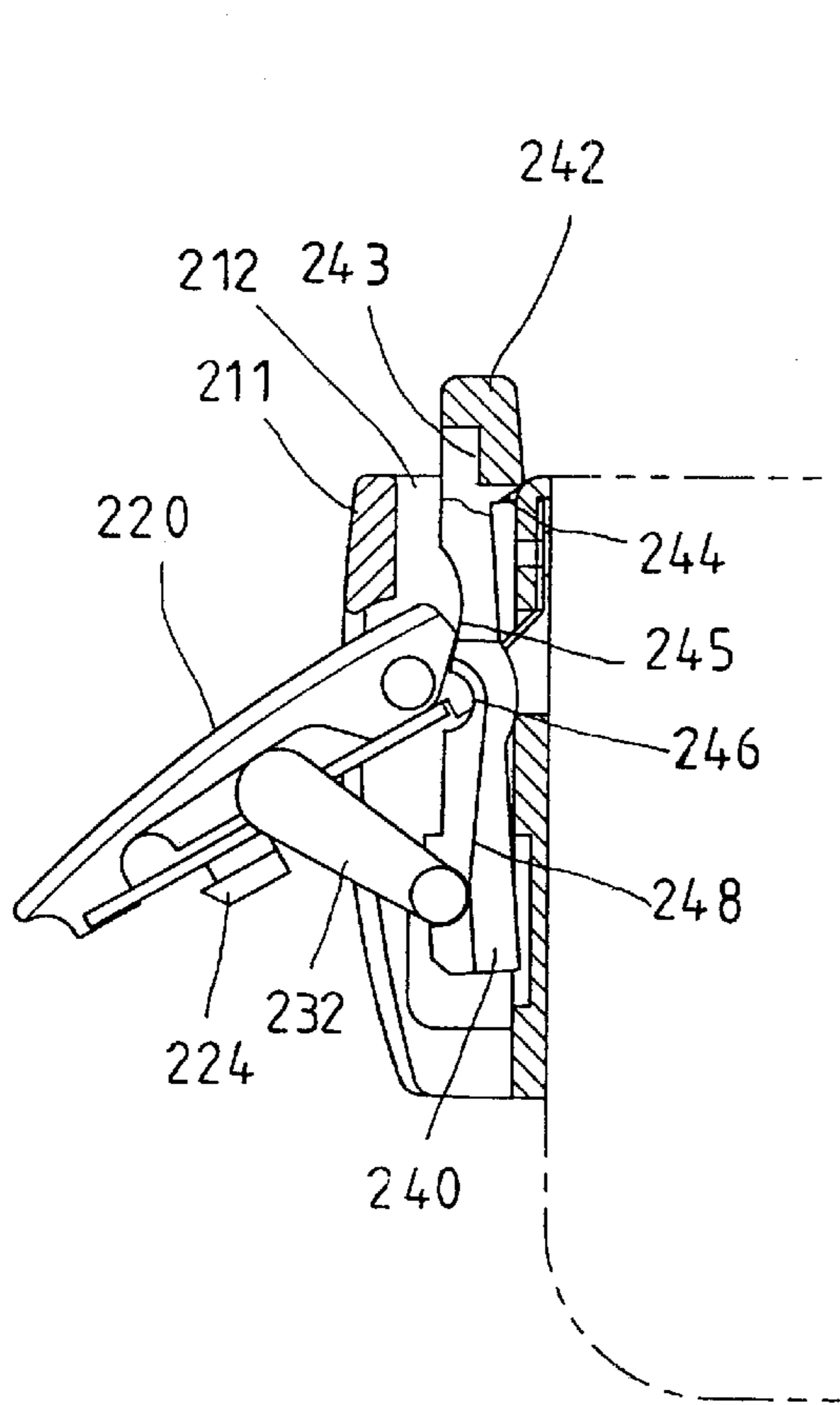


FIG. 9

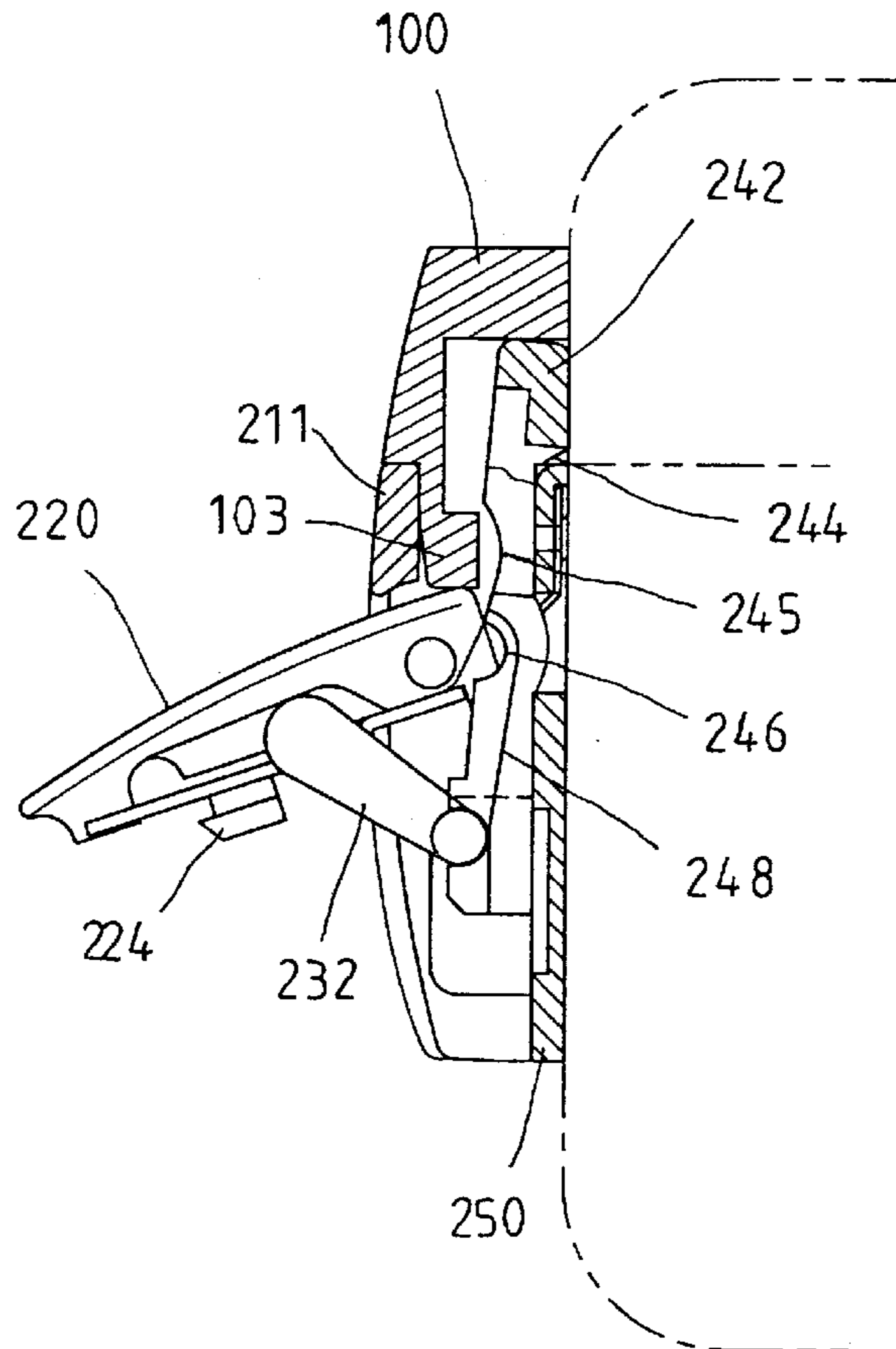


FIG. 10

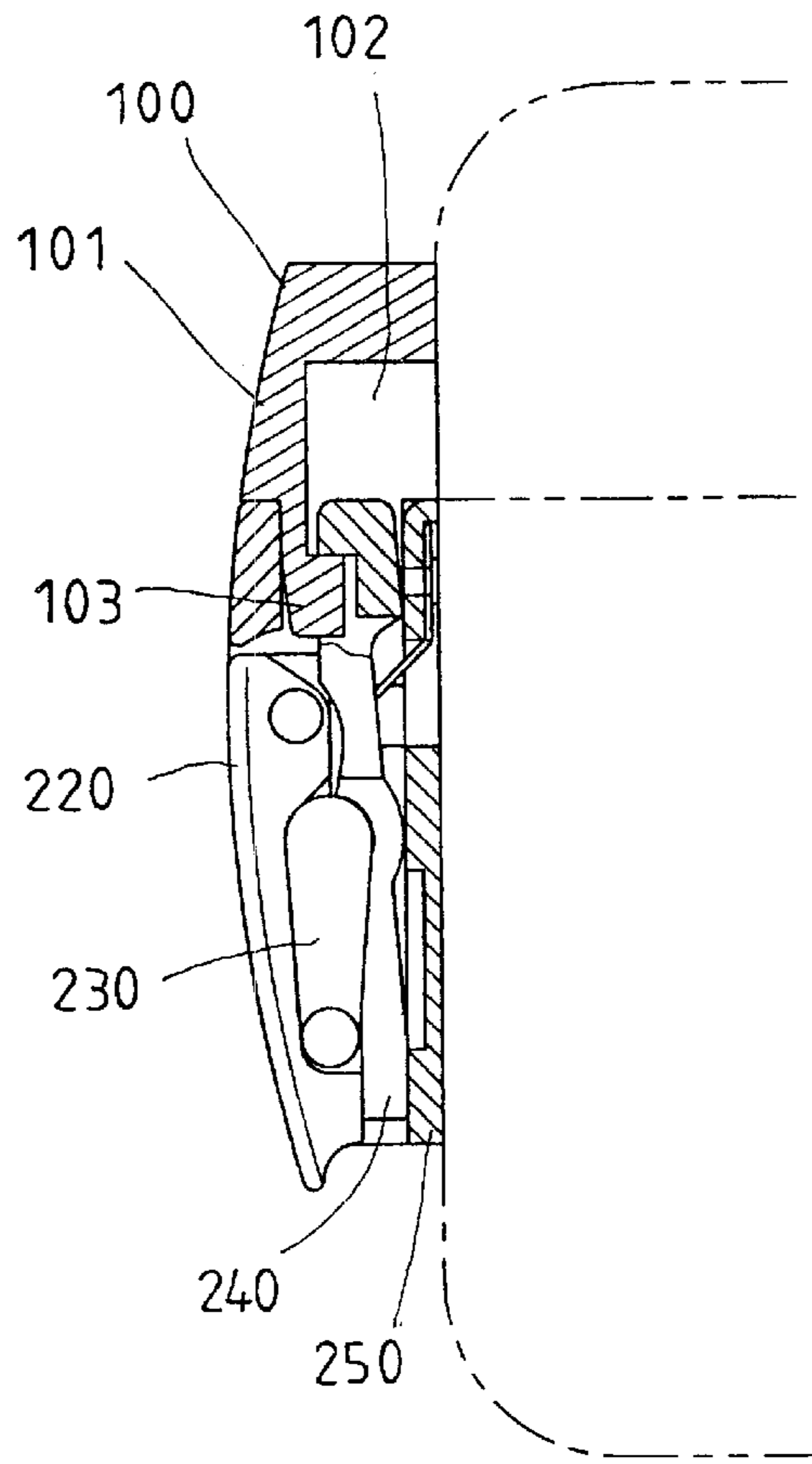


FIG. 11

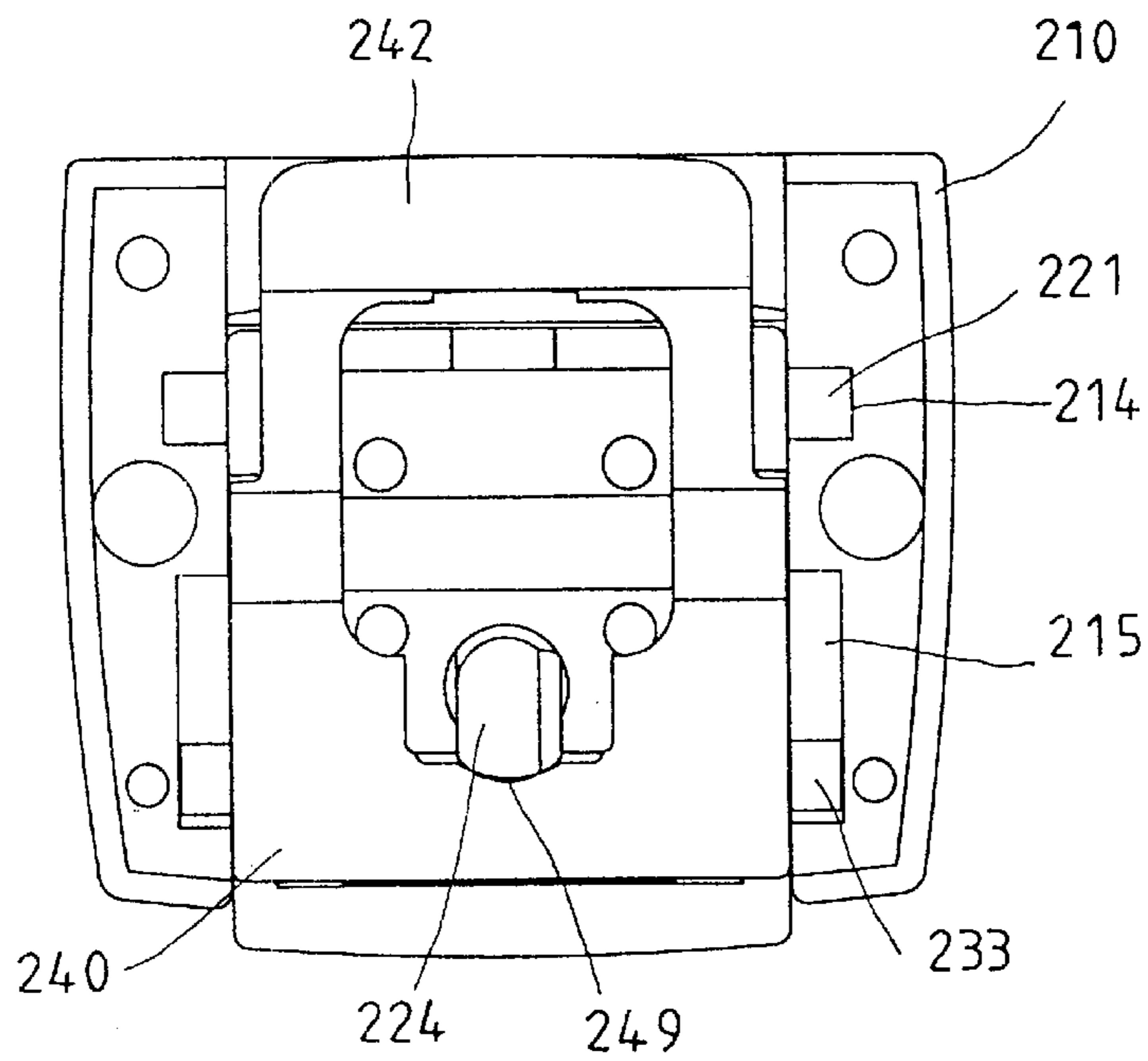


FIG. 12

CASE LOCK

FIELD OF THE INVENTION

The present invention relates to locks, and, more specifically, to a case lock for use in a suitcase, trunk, or the like.

BACKGROUND OF THE INVENTION

U.S. Pat. No. 4,679,833 discloses a lock for use in a case. This design of case lock comprises a fixed lock member and a movable lock body assembly. The movable lock body assembly comprises a bottom panel, an actuating member pivoted to the bottom panel, a retainer member for engaging the fixed lock member, and a link coupled between the retainer member and the actuating member. This design of case lock is still not satisfactory in function. When the user unlocked the case lock and opened the case, the retainer member of the lock body assembly has a part protruded over the top side of the case. The protruded part of the retainer member may injure the user's hands or damage the storage items when the user take out the storage items from the case.

SUMMARY OF THE INVENTION

The primary objective of the present invention is to provide a case lock, which keeps the movable members of the lock body assembly received below the elevation of the top side of the case when the user opened the case, preventing inconvenience to the user.

To achieve the objective of the present invention, the case lock comprises a fixed retaining member and a movable lock body assembly respectively fastened to the top and bottom cover shells of a case for locking the case. The fixed retaining member has an engagement block adapted for engaging into the movable lock body assembly when closing the top and bottom cover shells of the case. The movable lock body assembly comprises a front cover having a receiving recess, an actuating member pivoted to the front cover, a sliding retainer, a link and a back cover. The sliding retainer has an opening in middle section thereof, a front bar, a recessed portion in a top side of the front bar for engagement with the engagement block of the fixed retaining member, and a beveled face in a bottom side of the front bar. The sliding retainer is covered with its top side on the back side of the actuating member. The link is pivoted between the actuating member and the sliding retainer and adapted to move the sliding retainer in an axial direction while the link is driven by the actuating member. The back cover is covered on the bottom side of the front cover such that the back cover defines with the front cover a space, which receives the actuating member, the link, and the sliding retainer.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an exploded front view of a preferred embodiment of the present invention.

FIG. 2 is a rear view of FIG. 1.

FIG. 3 is a rear view of the movable lock body assembly of the preferred embodiment of the present invention.

FIG. 4 is a front view of the link of the preferred embodiment of the present invention.

FIG. 5 is a side view of the link of the preferred embodiment of the present invention.

FIG. 6 is a side view of the sliding retainer of the preferred embodiment of the present invention.

FIG. 7 is a side view of the back cover of the preferred embodiment of the present invention.

FIG. 8 is a side view showing the movable lock body assembly installed in the case according to the preferred embodiment of the present invention.

FIGS. 9-11 are similar to FIG. 8 but showing the movable lock body assembly operated in different postures.

FIG. 12 is similar to FIG. 3 but showing the movable lock body assembly locked.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIGS. from 1 through 3, a case lock is shown comprised of a fixed retaining member 100 and a movable lock body assembly 200 respectively fastened to the top and bottom cover shells of a case (for example, a suitcase or trunk). The fixed retaining member 100 is an elongated member having an extension portion 101 outwardly protruded from the middle part, a recessed receiving portion 102 formed in the bottom side of the extension portion 101, and an engagement block 103 downwardly protruded from the bottom side of the free end of the extension portion 101. When closing the top and bottom cover shells of the case, the extension portion 101 of the fixed retaining member 100 is forced into the movable lock body assembly 200 and locked.

The movable lock body assembly 200 is comprised of a front cover 210, an actuating member 220, a link 230, a sliding retainer 240, and a back cover 250.

The front cover 210 comprises a transverse shoulder 211, and two arms 213 respectively extended from the ends of the transverse shoulder 211 at right angles in same direction. The transverse shoulder 211 has a receiving recess 212 in the bottom side. The arms 213 each have a coupling hole 214 and a longitudinal sliding groove 215 respectively disposed in the bottom side.

The actuating member 220 is a rectangular member comprising two side pivots 221 symmetrically disposed at two sides near one end and respectively pivoted to the coupling holes 214 of the front cover 210 for enabling the actuating member 220 to be received in between the arms 213 of the front cover 210. The actuating member further comprises a keyway 222 in the front side, a lock cylinder 223 in the back side, and a swivel hook 224 coupled to the lock cylinder 223.

The link 230, as shown in FIGS. 2, 4, and 5, comprises a pivot axle 231 pivoted to the back side of the actuating member 220, and two arm rods 232 respectively connected to the ends of the pivot axle 231 and arranged in parallel. The arm rods 232 each have the respective free end terminating in a respective coupling portion 233 respectively positioned in the longitudinal sliding grooves 215 of the arms 213. According to this embodiment, the link is a unitary device. Alternatively, the link can be formed of two separated members.

The sliding retainer 240, as shown in FIGS. 1, 2, and 6, is a substantially rectangular member comprising an opening 241 in the middle, an inverted U-shaped front bar 242, a recessed portion 243 in the top side of the transversely extended middle section of the inverted U-shaped front bar 242, a beveled face 244 in the bottom side of the transversely extended middle section of the inverted U-shaped front bar 242, two recessed bearing portions 245 respectively disposed in the top side of the two longitudinally extended end sections of the inverted U-shaped front bar 242 near the front side, two rear receiving grooves 247 respectively disposed

in the top side of the two longitudinally extended end sections of the inverted U-shaped front bar **242** near the rear side, two middle receiving grooves **246** respectively disposed in the top side of the two longitudinally extended end sections of the inverted U-shaped front bar **242** and spaced between the recessed bearing portions **245** and the rear receiving grooves **247**, two recessed shoulder portions **248** respectively disposed in the top side of the two longitudinally extended end sections of the inverted U-shaped front bar **242** and longitudinally extended at one side of the middle receiving grooves **246** and the rear receiving grooves **247**, and a recessed stop portion **249** in the rear side of the periphery of the opening **241**. The sliding retainer **240** is covered with its top side over the back side of the actuating member **220**, keeping the ends of the pivot axle **231** respectively positioned in the middle receiving grooves **246** and the coupling portions **233** of the arm rods **232** respectively coupled to the rear receiving grooves **247**, and the arm rods **232** respectively rested in the recessed shoulder portions **248**.

The back cover **250**, as shown in FIG. 7, has a front spring plate **251** for pressing on the actuating member **220** to force the actuating member **220** against the front cover **210**. The back cover **250** has its top side covered on the bottom side of the front cover **210**, keeping the actuating member **220**, the link **230** and the sliding retainer **240** positioned in the space defined within the front-cover **210** and the back cover **250**.

When in use, the actuating member **220** is disposed adjacent to the back cover **250**, the sliding retainer **240** is completely received inside the movable lock body assembly **200**, and the front sides of the front cover **210**, sliding retainer **240** and back cover **250** of the movable lock body assembly **200** are maintained in flush with the top edge of the case as shown in FIG. 8. Therefore, the case lock has no protruded portion that may injure the user's hands or damage the storage items.

When closing the case, pull the actuating member **220** outwards to move the link **230** far away from the back cover **250**. At this time, the arm rods **232** pull the coupling portions **233** of the arm rods **232** along the longitudinal sliding grooves **215** toward the front side of the front cover **210**, thereby causing the sliding retainer **240** to be moved axially forwards as shown in FIG. 9. Following forward movement of the sliding retainer **240**, the two ends of the front side of the actuating member **220** are moved backwards along the recessed bearing portions **245** of the sliding retainer **240**, thereby causing the link **230** to push the sliding retainer **240** forwards to a predetermined distance when the actuating member **220** turned to the outer side. When the sliding retainer **240** pushed forwards by the link **230**, the inverted U-shaped front bar **242** and the beveled face **244** are extended out of the movable lock body assembly **200**. Because the front side of the sliding retainer **240** is tilted in direction toward the back cover **250** when the front side of the actuating member **220** moved along the recessed bearing portions **245** to the top, as shown in FIG. 10, the distance between the top side of the inverted U-shaped front bar **242** and the bottom side of the transverse shoulder **211** of the front cover **210** is relatively increased. Therefore, when the user closes the case, the fixed retaining member **100** is forced to engage its extension portion **101** into the receiving recess **212** of the transverse shoulder **211**. When closed the case, the actuating member **220** is turned in the reversed direction to move the link **230** and the sliding retainer **240**, thereby causing the inverted U-shaped front bar **242** to be moved with the sliding retainer **240** backwards to the inside

of the movable lock body assembly **200** and received in the recessed receiving portion **102** of the fixed retaining member **100**, and therefore the case is locked as shown in FIG. 11. At this time, the user can insert the key into the keyway **222**, and then drive the key to rotate the lock cylinder **223**, causing the swivel hook **224** to be moved from the transverse direction to the longitudinal direction and engaged into the recessed stop portion **249** in the rear side of the periphery of the opening **241** to lock the actuating member **220** and the sliding retainer **240**.

What is claimed is:

1. A case lock comprising a fixed retaining member and a movable lock body assembly respectively fastened to the top and bottom cover shells of a case for locking said case, said fixed retaining member having an engagement block adapted for engaging into said movable lock body assembly when closing the top and bottom cover shells of said case, said movable lock body assembly comprising:

a front cover having a transverse shoulder which is provided in a bottom side thereof with a receiving recess, and two arms respectively extended from two ends of said transverse shoulder at right angles in same direction, said arms each having a coupling hole at an inner side;

an actuating member having two side pivots symmetrically disposed at two sides and respectively pivoted to the coupling holes of said front cover for enabling said actuating member to be received in between the arms of said front cover;

a sliding retainer having a top side covered on the back side of said actuating member, a middle opening, a front bar, a recessed portion in a top side of said front bar for engagement with the engagement block of said fixed retaining member, and a beveled face in a bottom side of said front bar;

a link pivoted between said actuating member and said sliding retainer and adapted to move said sliding retainer in an axial direction while the link is driven by the actuating member and moved along with said actuating member; and

a back cover covered on the bottom side of said front cover, said back cover defining with said front cover a space, which receives said actuating member, said link, and said sliding retainer.

2. The case lock as claimed in claim 1, wherein said sliding retainer has two rear receiving grooves respectively disposed in two longitudinally extended end sections of said front bar.

3. The case lock as claimed in claim 2, wherein said link has one end pivoted to said actuating member and an opposite end pivoted to said rear receiving grooves of said sliding retainer.

4. The case lock as claimed in claim 3, wherein said sliding retainer comprises two recessed bearing portions, said two rear receiving grooves and two middle receiving grooves respectively disposed in said two longitudinally extended end sections of said front bar.

5. The case lock as claimed in claim 4, wherein said link has a pivot axle, two arm rods respectively connected to the ends of the pivot axle, and two coupling portions respectively connected to the ends of said two arm rods; wherein said sliding retainer is covered with the top side thereof on the back side of said actuating member such that the two ends of said pivot axle of said link are respectively disposed in the middle receiving grooves of said sliding retainer and an inner end of each of the coupling portions of said link is

5

respectively disposed in the rear receiving grooves of said sliding retainer.

6. The case lock as claimed in claim **5**, wherein said front cover comprises two longitudinal sliding grooves; the coupling portions of said link each having an outer end respectively positioned in the longitudinal sliding grooves of said front cover.

7. The case lock as claimed in claim **4**, wherein said link comprises a pivot axle, two arm rods respectively connected to the ends of the pivot axle, and two coupling portions respectively connected to the ends of said two arm rods; wherein said pivot axle of said link is pivoted to the back side of said actuating member; wherein said front cover comprises two longitudinal sliding grooves; wherein the coupling portions of said link each has an outer end respectively positioned in the longitudinal sliding grooves of said front cover.

8. The case lock as claimed in claim **5**, wherein said sliding retainer comprises two recessed shoulder portions respectively disposed in said two longitudinally extended end sections of said front bar at an outer side relative to said

6

rear receiving grooves and said middle receiving grooves for the resting of the arm rods of said link.

9. The case lock as claimed in claim **1**, wherein said fixed retaining member comprises an extension portion outwardly protruded from a middle part thereof, a recessed receiving portion formed in a bottom side of said extension portion; wherein said engagement block is downwardly protruded from a bottom side of said extension portion for insertion with said extension portion into said movable lock body assembly when closing said case.

10. The case lock as claimed in claim **1**, wherein said actuating member comprises a keyway in a front side thereof, a lock cylinder in a back side thereof, and a swivel hook coupled to said lock cylinder.

11. The case lock as claimed in claim **10**, wherein said sliding retainer has a recessed stop portion disposed in a rear side of the periphery of said middle opening for engagement with the swivel hook of said actuating member.

* * * * *

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 6,547,293 B1
DATED : April 15, 2003
INVENTOR(S) : Ching-Yuan Cheng

Page 1 of 1

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Title page,

Item [76], delete “**Ching-Yuan Cheng**, No. 64-5, Alley 70, Lane 419, Betiuen Rd. Betiuen Chiu, Taichung (TW)”, and insert therefor -- **Chin-Yuan Cheng**, No. 50, Lane 138, Chiaoshiao St., Beituen Chiu, Taichung, Taiwan, R.O.C. --

Signed and Sealed this

Twenty-sixth Day of August, 2003

A handwritten signature in black ink, appearing to read "James E. Rogan", written over a horizontal line.

JAMES E. ROGAN
Director of the United States Patent and Trademark Office